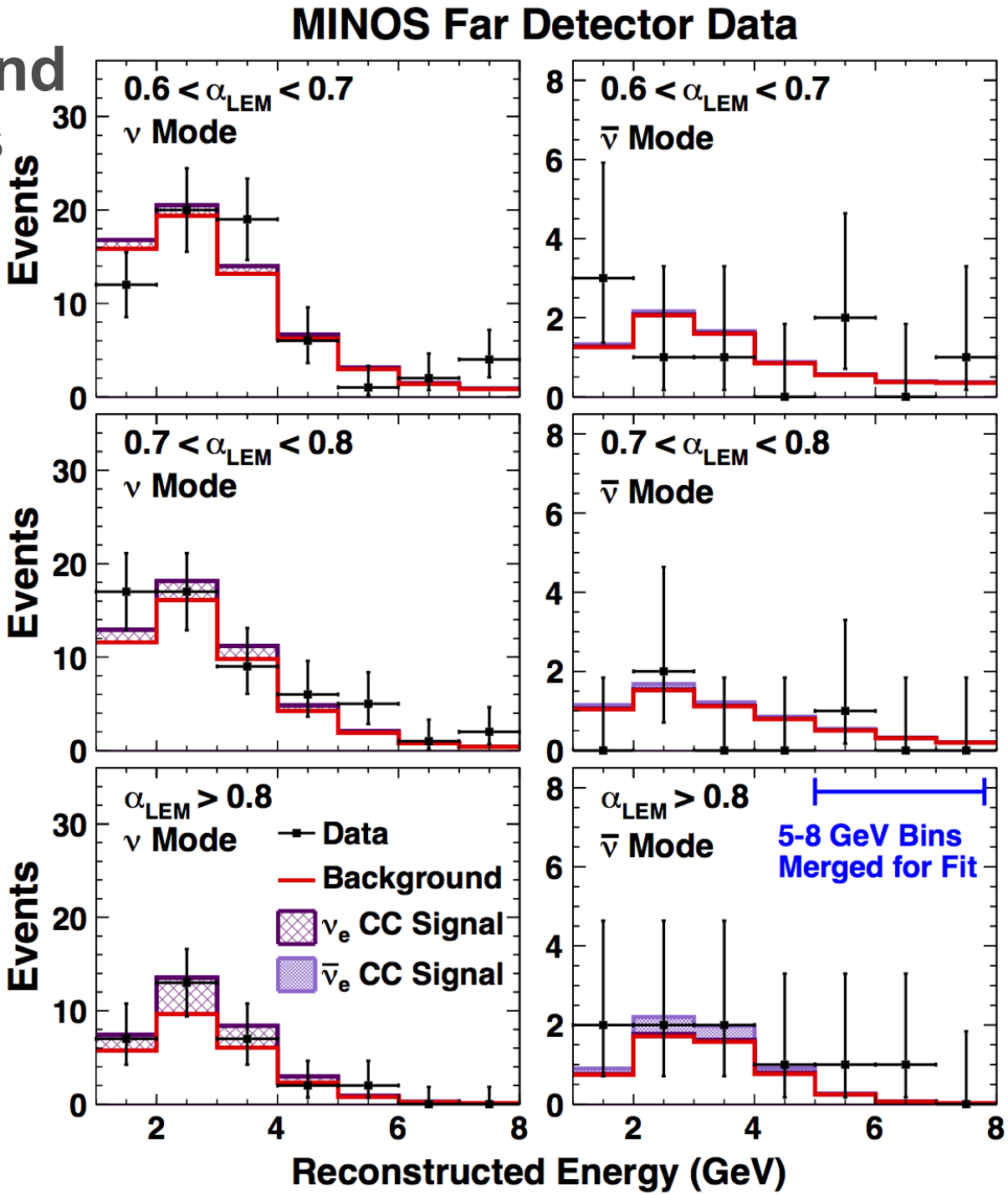
Electron neutrino and antineutrino appearance in the full MINOS data sample

Phys.Rev.Lett. 110 (2013) 171801
arXiv:1301.4581 [hep-ex]

Selected candidate electron neutrino and antineutrino events

The reconstructed energy distributions for three ranges of the LEM selection variable. The plots on the left correspond to data collected in the neutrino beam mode. The plots on the right correspond to data collected in the antineutrino beam mode.

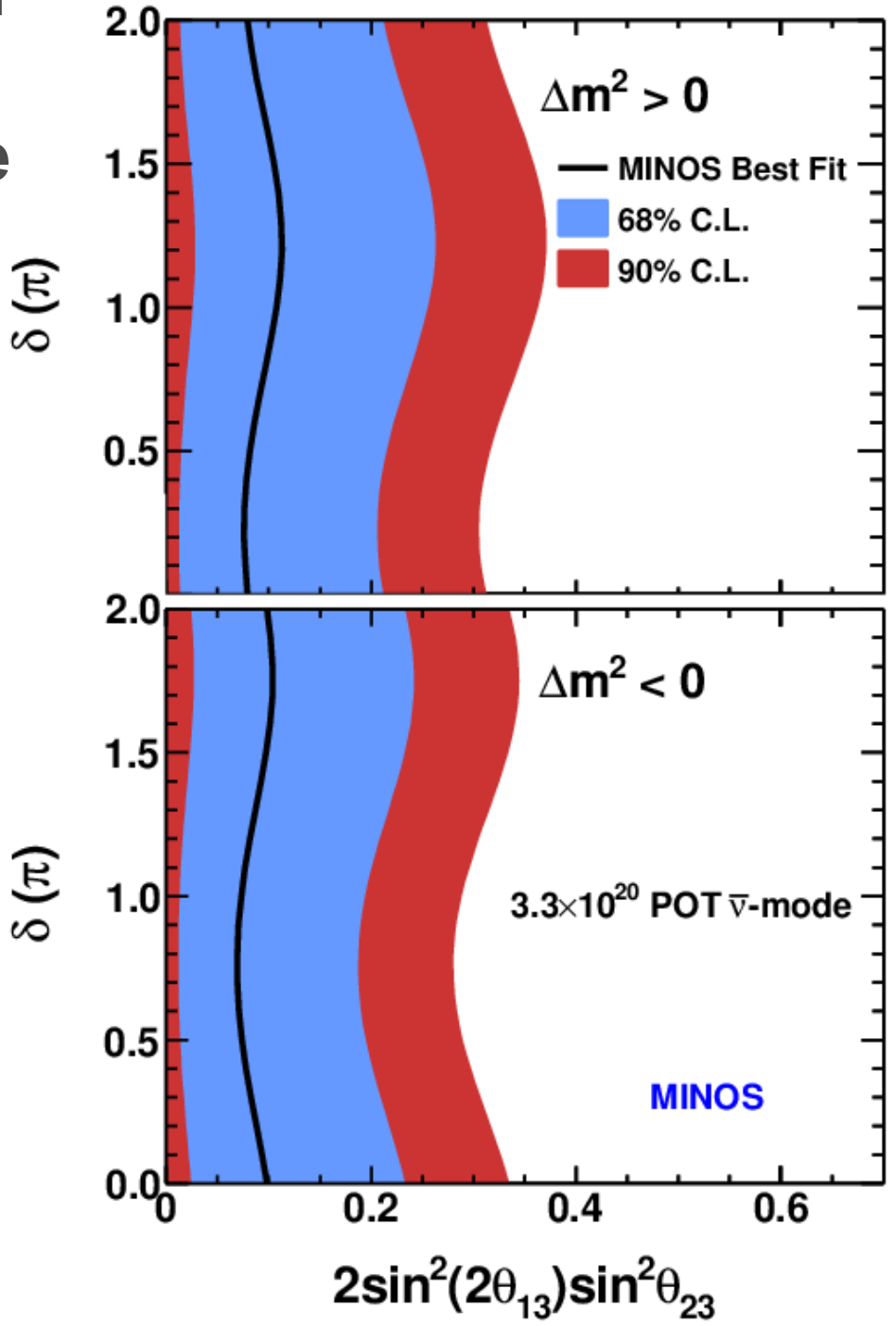
Note we are unable to distinguish between ν_e and $\bar{\nu}_e$ events, so the selected events include a combined contribution of $\nu_e + \bar{\nu}_e$ events.



Results on appearance of electron antineutrinos with 3.3×10^{20} POT $\bar{\nu}$ mode running

Exclusion limits based on the selected candidate event distribution in antineutrino mode running

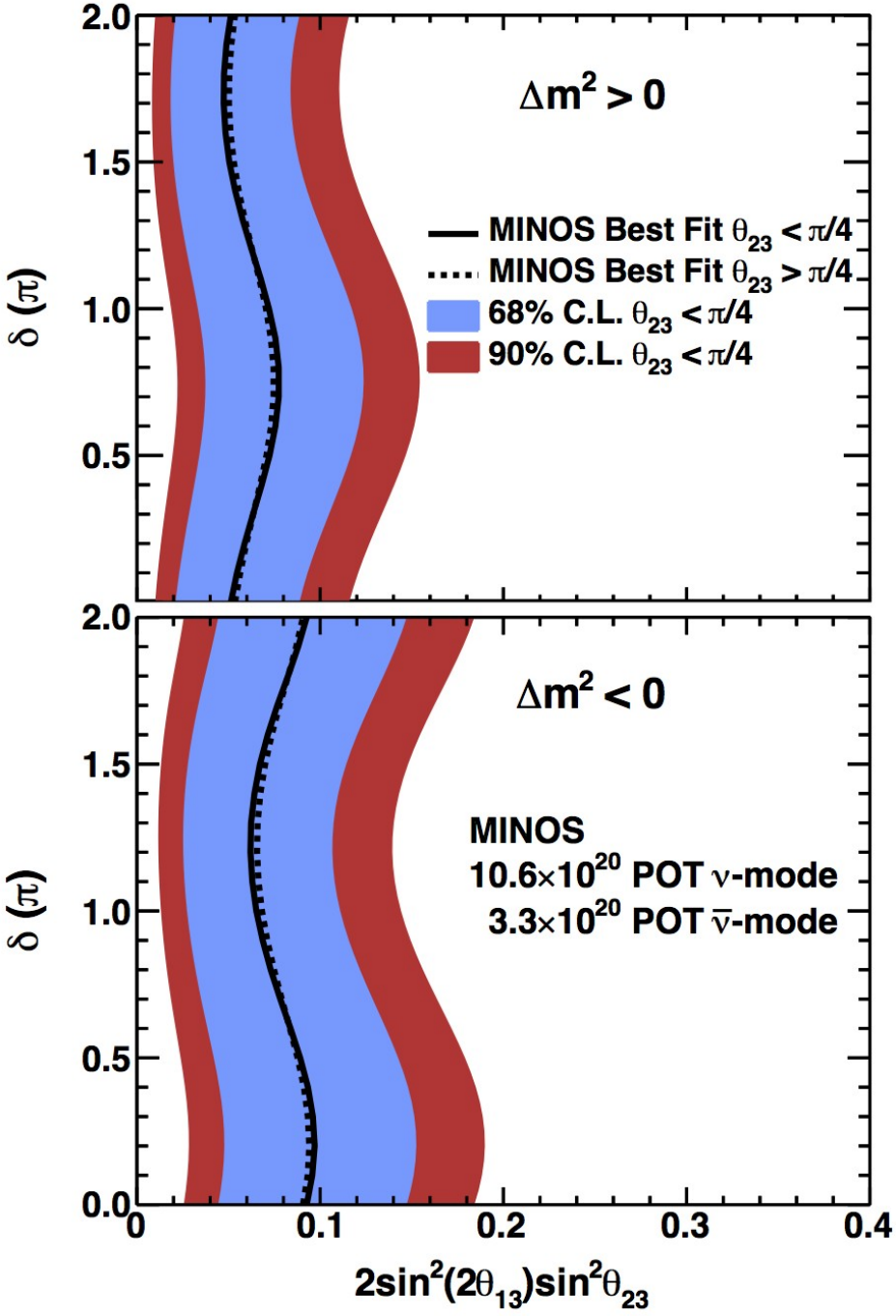
Allowed values are in the color regions



Results on appearance of electron (anti-)neutrinos with 3.3×10^{20} POT $\bar{\nu}$ mode running and 10.6×10^{20} POT ν mode running

Exclusion limits based on the selected candidate event distributions for both antineutrino mode running and neutrino mode running

Allowed values are in the color regions



Results on appearance of electron (anti-)neutrinos with 3.3×10^{20} POT $\bar{\nu}$ mode running and 10.6×10^{20} POT ν mode running

The resulting values of the likelihood, shown here as $-2\Delta\ln(L)$, from a fit of δ to our data using constraints from reactor experiments, assuming various values of the mass hierarchy and the sign of $(\theta_{23} - \pi/4)$. The difference is taken with respect to the best fitting solution.